Memorandum

Date: September 4, 1998

To: Policy Group

From: Roger Patterson
Regional Director, Mid-Pacific Region, U.S. Bureau of Reclamation

Subject: Partial Funding for the Madera Ranch Groundwater Banking Project

Summary

The CALFED Bay-Delta Program has identified expansion of south-of-Delta groundwater storage as one of 11 priority actions for 1998-99 that can be implemented under existing authorities. The Madera Ranch Groundwater Banking Project (Madera Ranch, or the Project) is specifically identified as one of the groundwater storage projects that can: (1) expand groundwater storage south-of-the Delta, (2) be implemented under existing authority, and (3) begin implementation in 1999.

This item is a request to use $14.5 million of the funds previously allocated for water acquisition to assist in acquiring an environmental share of Madera Ranch to supply water for environmental purposes. The remaining cost of the project, estimated between $75.5 million and $110.5 million depending on financing rates and construction costs, would be funded by grants and loans obtained by the Trust for Public Land (TPL) and funds from urban and agricultural water users. Because some of the funds provided through TPL will be in the form of a loan, an additional environmental share of the project may be gained at a later date by using environmental funds to repay the loaned portion of the TPL funds. Storage space in, and water retrieved from the groundwater bank will be made available for environmental, urban and agricultural use based on the pro rata contributions to project costs from environmental, urban and agricultural funding sources. Such environmental storage benefit would be in addition to the project mitigation requirements.

Consideration of this expenditure is import at this time because of the fortuitous circumstances of available funds in the water acquisition program, willingness of the current owner to sell, timely availability of grants and loans through TPL, and the willingness of water users to participate financially. In addition, CALFED has identified south of Delta groundwater storage as a high priority action for 1998/1999. While it might be possible to wait until the 1999 funding cycle, the seller has informed Reclamation that other offers being considered.

Following is a general description of the project and its benefits. In addition, a list of commonly asked questions and their responses is provided (Attachment A) along with the information packet submitted to the Integration Panel (Attachment B). The information packet is a summary of the Phase 1 Report completed by the Bureau of Reclamation (Reclamation) in May 1998. The Phase 1 Report is a pre-feasibility level analysis of the Project's capability and suitability to meet groundwater storage requirements south-of-the-Delta.

General Description

Madera Ranch is located in Madera County north and west of Fresno, approximately 8 miles from the Mendota Pool. Reclamation and the San-Luis & Delta-Mendota Water Authority (SLDMWA) have been jointly negotiating the purchase of Madera Ranch with the intent of developing a groundwater banking project to provide water for environmental, urban and agricultural use. Madera Ranch comprises 13,600 acres of largely undeveloped upland habitat identified by the Fish and Wildlife Service as Priority 1 habitat for as many as 40 special status species and habitats including the Blunt Nosed-Leopard Lizard, Kangaroo Rat, Kit Fox and vernal pools. The land is boarded on all sides by agricultural land. Currently, approximately 2,000 acres are under cultivation, 1,000 acres are being used for grazing, and the remaining 10,600 acres are undeveloped. The geologic characteristics and location of the site make it suitable for development of a groundwater bank capable of providing additional water supplies for environmental, urban and agricultural use.

The total cost of the project is between $90 and $125 million depending on financing rates and actual construction costs. The cost of facilities necessary for the Project is estimated at $60 million (spreading basins, groundwater extraction wells, and a conveyance pipeline to Mendota Pool). The SLDMWA has indicated that it would pay a portion of the costs for construction of facilities depending on the anticipated water supply benefits SLDMWA may receive. The SLDMWA has indicated that if the actual construction costs equal $60 million then SLDMWA will consider paying the $10 million premium to the owner. However, the premium will be reduced for each dollar the actual construction costs exceed $60 million. Although negotiations are ongoing, the cost of land for the Project is estimated at $40 million plus the additional $10 million premium mentioned above, which may or may not be payable depending on the Project's actual construction costs. Initially, TPL would purchase the property with a mixture of grant and loan funds from other sources. TPL would transfer title to the SLDMWA and/or a to-be-created operating entity as funds become available to repay the loan.

The Project's environmental benefits are twofold. First, the Project will provide 390,000 acre-feet of groundwater storage and up to 70,000 acre-feet of yield, a portion of which will be used to meet environmental water demands. Environmental water available from the Project may be used in several ways. Water may be returned from the Project to Mendota Pool and then delivered to wildlife refuges south-of-the-Delta. Alternatively, water could be returned from the Project and released as instream flow in the San Joaquin River. Under this scenario water could be made available in the San Joaquin River to supplement flows provided by the

Vernalis Adaptive Management Plan or to meet other instream environmental needs. Water could also be returned to Mendota Pool and delivered to urban or agricultural contractors south-of-the-Delta in exchange for reduced pumping rates in the Delta. Finally, once the water is in storage it could be sold to urban or agricultural users and the money used for other environmental projects.

The second environmental benefit accrues from the land itself. The land is designated by the Fish and Wildlife Service as Priority 1 habitat that can be managed consistent with project operations to provide habitat for special status species. The investigation and analysis completed as part of the Phase 1 Report, and summarized in Attachment B indicates that groundwater banking facilities, including recharge basins, could be designed to minimize impacts to special status species and habitats.

While management of the land as habitat is exclusively an environmental benefit, the water available from the project will be allocated according to CALFED's beneficiary pays principle. Therefore, if total project costs are $110 million for land and facilities, and SLDMWA pays $60 million for facilities plus the $10 million premium, then SLDMWA would receive 64 percent of the Project's storage capacity and yield [($60 +$10) / $110 = 64 percent]. Similarly, if CALFED and other environmental sources pay $40 million, then environmental uses will receive 36 percent of the storage capacity and yield ($40 / $110 = 36 percent). Although negotiations are currently ongoing and changes may occur, funding is currently being sought from the following sources in the amounts listed.

Land		Facilities	
TPL	$8M Grant	SLDMWA	$60M
TPL	$17.5M Loan	SLDMWA Premium	$10M
CALFED	$14.5M		
Total	$40M	Total	$70M
Grand Total	$110M		

To ensure that the benefits of the Project are allocated according to the sources of funding used to construct the Project, it is necessary to develop operating principles that define how the amounts of water, timing, and operational flexibility allocated to environmental and agricultural uses will operate together. Reclamation and SLDMWA have not yet developed these operating principles. Rather, it is important that representatives of each funding source be included in developing the operating principles. Therefore, once the various sources of funding are identified, representatives from the environmental and agricultural agencies and/or communities will be asked to develop the operating principles.

Currently, one of the most serious issues regarding the Project is associated with concerns of the local community and landowners adjacent to the Project. Adjacent landowners are concerned that retrieval of water from the project will result in significant declines in their groundwater levels. These concerns are important and will be present in development of all groundwater banking programs. For this reason, successful implementation of the Madera Ranch Project should include input from local interests in developing the Project's operational principles.

Action

Reclamation requests that the CALFED Policy Group approve use of $14.5 million of the funds allocated for water acquisition to acquire an environmental share of the Madera Ranch Groundwater Banking Project. If the Policy Group chooses not to use 1998 Water Acquisition funds, then Reclamation requests approval to use $14.5 million of 1999 funds. Policy Group approval should be conditioned on receiving the advice of the Ecosystem Roundtable after presentation and discussion of the Project at the September 21, 1998, Ecosystem Roundtable meeting.

Attachment A

Answers to Commonly Asked Questions About the Madera Ranch Groundwater Banking Project

1. What assurances are there that the environment will actually get water from Madera Ranch?

The rights and interests of the participants in the Project will be protected first by contracts and second by the Project's operating principles. The operating principles will be developed in a cooperative effort between all of the parties that have contributed funds to pay for the Project. Decisions on when, where, and how to use the environmental share of water stored in the Project will be made by either an environmental agency, consortium of environmental agencies (e.g., F&WS, DF&G, and NMFS) or by and environmental trustee set up specifically for that purpose.

2. How can the water be used to benefit the environment?

Water stored in Madera Ranch may be used by the environment in a variety of ways.

- Water could be used to provide additional San Joaquin River instream flows in excess of those provided by the Vernalis Adaptive Management Plan.
- Water could be used to meet Level 4 refuge demands for south of Delta refuges
- Water could be delivered to consumptive uses in exchange for reduced export pumping during environmentally sensitive times.
- Water could be sold to consumptive users and the money used to fund other environmental restoration projects.

3. What public outreach has been done?

Several members of the local community around Madera Ranch have expressed concerns about the project. Interior has held two public information meetings in the local area and the current owner of Madera Ranch has sponsored several meetings with adjacent landowners. The concerns expressed are valid and must be taken in to account in implementing the project. Although this may not be easy, it has been accomplished for other groundwater banking projects. In addition to the normal CEQA and NEPA processes, Interior will agree to hold public meetings and workshops throughout implementation of the project to ensure that adjacent landowners have input to and are knowledgeable about how the project will operate.

4. How can adjacent landowners be protected from operational impacts to groundwater supplies?

The Semitropic Groundwater Banking Program serves as a real life example. There the groundwater banking partners developed an operational rule that limits the ability to use the project in any year the water table drops by more than 15 feet or a total of more than 15 feet in any three consecutive years. In addition the groundwater banking partners formed a groundwater monitoring committee composed of the adjacent landowners. The monitoring committee meets monthly to review the project's operations and impacts on groundwater levels. The same or a similar type of protection for adjacent landowners can be built into the operational principles of the Madera Ranch project.

5. What operational criteria will be used to determine when water is used for environmental purposes and when water is used for consumptive purposes?

Operational criteria has not yet been developed. Operational criteria will be developed between Interior and the participating interests. If funds from environmental sources are used then CALFED agencies such as the F&WS and CDF&G must be part of developing the operational criteria to ensure environmental benefits equal to their investment are realized. If funds from agricultural or urban interests are used then those interests also must be part of developing the operational criteria. This is consistent with CALFED's beneficiary pays principle.

6. What if the land is purchased but the groundwater banking portion of the project proves to be infeasible?

If this scenario occurs, then there is some potential that those who have invested in the project will end up owning a very large piece (13,600 acres) of priority 1 habitat. As priority 1 habitat the F&WS has indicated that up to 40 special status species may benefit from the purchase of Madera Ranch. Specifically, the F&WS has indicated that the Kit Fox, Blunt-Nosed Leopard Lizard, Kangaroo Rat and vernal pools are present on this type of habitat. As a result, even if the groundwater banking portion of the project is infeasible, significant environmental benefit will have been gained through the protection of more than 13,600 acres of priority 1 habitat for a wide variety of special status terrestrial species. One inconsistency that should be noted is that if this scenario occurs then water acquisition monies will have been used to purchase terrestrial habitat.

7. What are the project costs?

Land costs are $40 million plus the possibility of a $10 million premium and facilities costs are estimated at $60 million. Based on these numbers the per acre-foot costs are estimated at between $150 to $175 including the cost of operation, maintenance and financing.

8. What sources of water are available for storage in the project?

Water could be available for storage in all years when either the State or Federal side of San Luis fills early and pumping capacity is available without violating any of the Delta standards. Water is also available from the San Joaquin River in years when winter flood flows are sufficient to reach Mendota Pool. This past year is a good example. Finally, under the November 20 decision, 50,000 acre-feet will be available from the joint point of diversion for environmental use each year. That water is first stored in San Luis to the extent storage space is available. However, once San Luis fills, the 50,000 acre-feet of environmental water spills and is either lost or can be placed in to long-term storage in Madera Ranch. Once the water is stored in Madera Ranch it may be used for any of the purposes described in Question 3 above.

9. How will the project's impact on the priority 1 habitat be mitigated?

Implementation of the project will cause temporary disturbance during construction of the wells and spreading basins and potentially permanent disturbance in the areas around the above ground facilities. These impacts may be mitigated by enhancing the habitat values of the remaining 10,100 acres of the Ranch.

10. How does Madera Ranch fit with Interior's (b)(2) decision?

Madera Ranch was identified in Interior's November 20, 1997 (b)(2) decision as a potential site for a long-term groundwater storage project. Because the November 20, decision requires the project to be developed under the "beneficiary pays" principle, any money from environmental sources such as CALFED Bay-Delta Act funds would be credited toward the environmental share of project costs and result in an equal amount of environmental benefit. The amount of groundwater storage and retrieval capacity available for environmental use will be in direct proportion to the amount of funds contributed to project costs from environmental sources.

11. How do we know that Madera Ranch is the best property available for a groundwater banking project? Could there be a better site that would provide a better groundwater bank for CALFED's purposes?

Madera Ranch has several characteristics that make it an excellent choice as a groundwater banking site suitable for CALFED's purposes. Madera Ranch is located less than 8 miles from the Mendota Pool. As a result, a groundwater bank at Madera Ranch will be able to take water out of the Mendota Pool and return water to the Pool. This means that Madera Ranch will be able to receive water from either the state or federal projects, or any other water source that can deliver water to the Delta for export. Because water can be returned from Madera Ranch to the Mendota Pool, a groundwater bank at the Madera Ranch site will allow water to be physically delivered to any point that can receive Central Valley Project or State Water Project water. In

addition, water from Madera Ranch can be backed into San Luis Reservoir, Lake Oroville, or Shasta Lake by exchange. This very wide range of operational flexibility makes Madera Ranch an ideal site from an operational perspective.

Madera Ranch is also a good choice as a groundwater banking site because it can provide significant terrestrial habitat for special status species. Generally, other groundwater banking sites will be under a current agricultural use that precludes habitat for special status species. By contrast, only approximately 3,000 acres of Madera Ranch is being used for agriculture with the remaining 10,600 acres as upland habitat identified by the F&WS as priority 1 habitat. Because the pre-feasibility analysis indicates that the groundwater banking project can be implemented consistent with habitat management at the site, Madera Ranch provides an additional environmental benefit which is likely not to be available at other sites.

Another benefit of the Madera Ranch site is that the current land use does not include significant groundwater pumping. As a result there is no conflict with the current use of groundwater at the site. This is different from most other sites because groundwater banks that share pumping with existing use are generally limited to extractions only during the "off-peak" season (October through March). Because the Madera Ranch site does not have such a conflicting use water could be delivered out of the groundwater bank during both "off-peak" and "on-peak" seasons. However, it should be noted that as with all groundwater banks, deliveries out of the bank must be managed to minimize or eliminate impacts on adjacent landowners.

Finally, because groundwater banks require significant amounts of land it will be necessary to purchase, or otherwise control through an agreement several thousands of acres of land. It is easiest to accomplish this by working with a minimum number of landowners. Madera Ranch has only one owner and that owner is able to contract for the sale of all 13,600 acres. It is unlikely that there is another site, similarly located near the Mendota Pool, that would afford such a simple contractual relationship.

Attachment B

Integration Panel

Project Location

Madera Ranch is located in southwestern Madera County approximately 20 miles northwest of Fresno (see Figure 1).

Madera Ranch Groundwater Bank Operations

The proposed Madera Ranch groundwater bank could provide storage for a water reserve account that would assist Interior in meeting the requirements under Public Law 102-575 Title XXXIV (CVPIA). Requirements dedicating 800,000 acre feet to enhance fish and wildlife and associated habitats are described in Section 3406 (b) (2), and detailed in the final *Administrative Proposal on the Management of Section 3406 (b)(2) Water*, released November 20, 1997.

Interior proposes creating a Water Reserve Account for environmental, agricultural, and urban uses. In the long-term (beyond 2000), the Water Reserve Account could be banked in the Madera Ranch Groundwater Banking Project.

Water to be stored at the water bank would be spills on the San Joaquin and Kings Rivers and CVP water pumped from the Delta. Water for storage would be diverted at the Mendota Pool and transported by a two way delivery canal to the recharge facility on the Madera Ranch. Water would be returned to the Mendota Pool when needed by pumping from the recharged aquifer into the two way delivery canal. Water returned to the Mendota Pool would be diverted for agricultural irrigation or refuge water needs. Other users of the water bank would participate by exchanges with Mendota Pool diverters. In stream flows in the San Joaquin River below Mendota Pool could also be supplemented by deliveries from the water bank. Operational rules would be developed to protect adjacent landowners from adverse impacts to the aquifer.

The operations of the proposed water banks were modeled using a spreadsheet model with the following assumptions:

1. 400 cfs channel capacity from Mendota Pool to Madera Ranch (24 taf/month)
2. 3,500 acre infiltration area, with a surface storage depth of 6 feet (21 taf)
3. 0.2 acre-feet/acre/day infiltration rate (21 taf/month)
4. 0.1 specific yield of the aquifer

5. 50 ft/day hydraulic conductivity of the aquifer.

6. 208 cfs maximum extraction rate (12.5 taf/month).

Other Assumptions

1. The source of infiltration water is spill water from Friant and Kings River north and releases from the Delta Mendota Canal originating in the Delta.

2. A 15 percent loss of Friant Dam spill water to the groundwater basin between Gravelly Ford and Mendota Pool.

3. The basic demand pattern is a combination of the agricultural pattern for demands from March through September and Refuge water demands for October and November.

A summary of the modeling results that were used in the May 1998 "Madera Ranch Groundwater Bank Phase 1 Report" is attached.

Biological Benefits and Impacts

The detailed investigation of biological benefits and impacts will occur during the next phase of the decision process leading to implementation of the groundwater bank. In concept, the project could be implemented and operated to benefit both aquatic and terrestrial species.

Aquatic species could benefit from the water stored in the groundwater bank for use in supplementing dry and critically dry year environmental water supplies. Terrestrial species, including special status species, on the Madera Ranch could benefit from habitat protection and enhancement activities with removal from private ownership and development.

Temporary impacts to terrestrial species will occur during construction of the supply canal, recharge ponds and retrieval wells. Construction of the recharge ponds will permanently convert up to 3500 acres from irrigated agriculture and undeveloped pasture to intermittently flooded land.

The potential for wetland development associated with construction of the recharge ponds will be investigated.